

Application No. 10/723,397  
Amendment Date June 25, 2007; Reply to Office Action of April 4, 2007

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## Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

### Listing of Claims:

Claim 1 (currently amended): A fast high precision matching method comprising the steps of:

- a) Input an image;
- b) Input a template;
- c) Perform initial search using the input image and the template to create an initial search result output;
- d) Perform high precision match based on a matching function of subpixel values or invariant high precision parameters using the initial search result, the input image, and the same template to create a high precision match result output.

Claim 2 (currently amended): The method of claim 1 wherein the high precision match step comprises the estimation of subpixel values or invariant high precision parameters by image interpolation and interpolation parameter optimization.

Claim 3 (original): The method of claim 1 wherein the high precision match step comprises a high precision match within one pixel range.

Claim 4 (original): The method of claim 1 wherein the high precision match step comprises a high precision match beyond one pixel range.

Claim 5 (canceled).

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Claim 6 (currently amended): The method of claim 5-1 wherein the high precision match step performs robust matching limits pixel contribution with maximum allowable value for a pixel.

Claim 7 (currently amended): The method of claim 5-1 wherein the high precision match step performs robust matching performs pixel weighting for variance and covariance calculation.

Claim 8 (canceled).

Claim 9 (currently amended): The method of claim 2 wherein the image interpolation is applied to the template rather than the input image.

Claim 10 (currently amended): The method of claim 9 wherein the template contains pre-calculated template variance parameters in addition to the template image.

Claim 11 (currently amended): The method of claim 2 wherein the interpolation parameter optimization includes a matching function maximization for the subpixel values or invariant high precision parameters.

Claim 12 (original): The method of claim 11 wherein the matching function maximization uses an iterative method.

Claim 13 (canceled).

Claim 14 (currently amended): A fast high precision matching method comprising the steps of:

- a) Input an image;

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- b) Input a template containing pre-calculated template variance parameters;
- c) Perform initial search using the input image and the template to create an initial search result output;
- d) Perform high precision match based on a matching function of subpixel values or invariant high precision parameters using the initial search result, the input image, and the same template to create a high precision match result output.

Claim 15 (original): The method of claim 14 wherein the high precision match step comprises a high precision match within one pixel range.

Claim 16 (original): The method of claim 14 wherein the high precision match step comprises a high precision match beyond one pixel range.

Claim 17 (currently amended): A fast high precision projection matching method comprising the steps of:

- a) Input a projection profile;
- b) Input a template profile;
- c) Perform high precision match based on a matching function of subpixel values or subsampling parameters using the projection profile, the same template profile to create a high precision projection match result output.

Claim 18 (canceled).

Claim 19 (currently amended): The method of claim 17 wherein the high precision match performs interpolation on the template profile rather than the input projection profile.

Claim 20 (currently amended): A fast invariant high precision matching method comprising the steps of:

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- a) Input an image;
- b) Input a template;
- c) Perform initial search using the input image and the template to create an initial search result output;
- d) Perform invariant high precision match based on a matching function of subpixel values or invariant high precision parameters using the initial search result, the input image, and the same template to create an invariant high precision match result output.

**Claim 21 (original):** The method of claim 20 wherein the invariant high precision match step comprises the estimation of subpixel and subsampling parameters by image interpolation and interpolation parameter optimization.

**Claim 22 (canceled).**

**Claim 23 (original):** The method of claim 21 wherein the image interpolation includes log-converted radial-angular transformation and linear interpolation.

**Claim 24 (currently amended):** The method of claim 21 wherein the interpolation parameter optimization includes a matching function maximization for the subpixel and subsampling parameters.

**Claim 25 (original):** The method of claim 24 wherein the matching function maximization uses an iterative method.

**Claim 26 (currently amended):** The method of claim 21 wherein the image interpolation is applied to the template rather than the input image.

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Claim 27 (currently amended): The method of claim 26 wherein the template contains pre-calculated template variance parameters in addition to the template image.